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NEW CULICINE LARVAE FROM THE GOLD COAST.

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Since Mr. F. W. Edwards' "Revised Keys to the known larvae of African Culicinae" appeared (Bull. Ent. Res. iii, pp. 373-385) the larvae of several additional species—all belonging to the tribe CULICINI—have been found in the Gold Coast Colony. These larvae, collected at Accra and at Sunyani in Ashanti, are briefly described here and their position in Mr. Edwards' keys indicated so far as possible.

***Stegomyia metallica***, Edw. (fig. 1).

The larva is dark in colour with prominent hook-like spines on the ventro-lateral aspect of the thorax; these spines are much larger than the corresponding spines in *S. fasciata*. The head is small, the antennae are short, with a single hair in place of a tuft and the mid-frontal hairs are simple single bristles. There are numerous stellate hairs on the thorax and the abdominal segments, a certain number of the stouter hairs on the abdomen are branched and rise from pedicles; these stouter hairs are subplumose at their bases. The comb consists of 6-10 barbed spines,\* the subsiphonal and siphonal plumes are of subplumose hairs. The siphon, which is barrel-shaped, is in length just over twice the diameter of its base; the pecten, running somewhat diagonally, is formed of from 12-14 spines and a hair-tuft of four hairs is placed at or just beyond the middle; a detached spine may occur beyond this hair-tuft. The anal papillae have rounded ends, the upper pair being about twice the length of the anal segment, the lower about two-thirds as long as the upper. The anal segment has a slight ventral beard and a plume of simple hairs laterally, on the posterior edge of the chitinous saddle.

\*The number is variable even on the two sides of the same larva; one specimen had three on one side and seven on the other.—F. W. E.

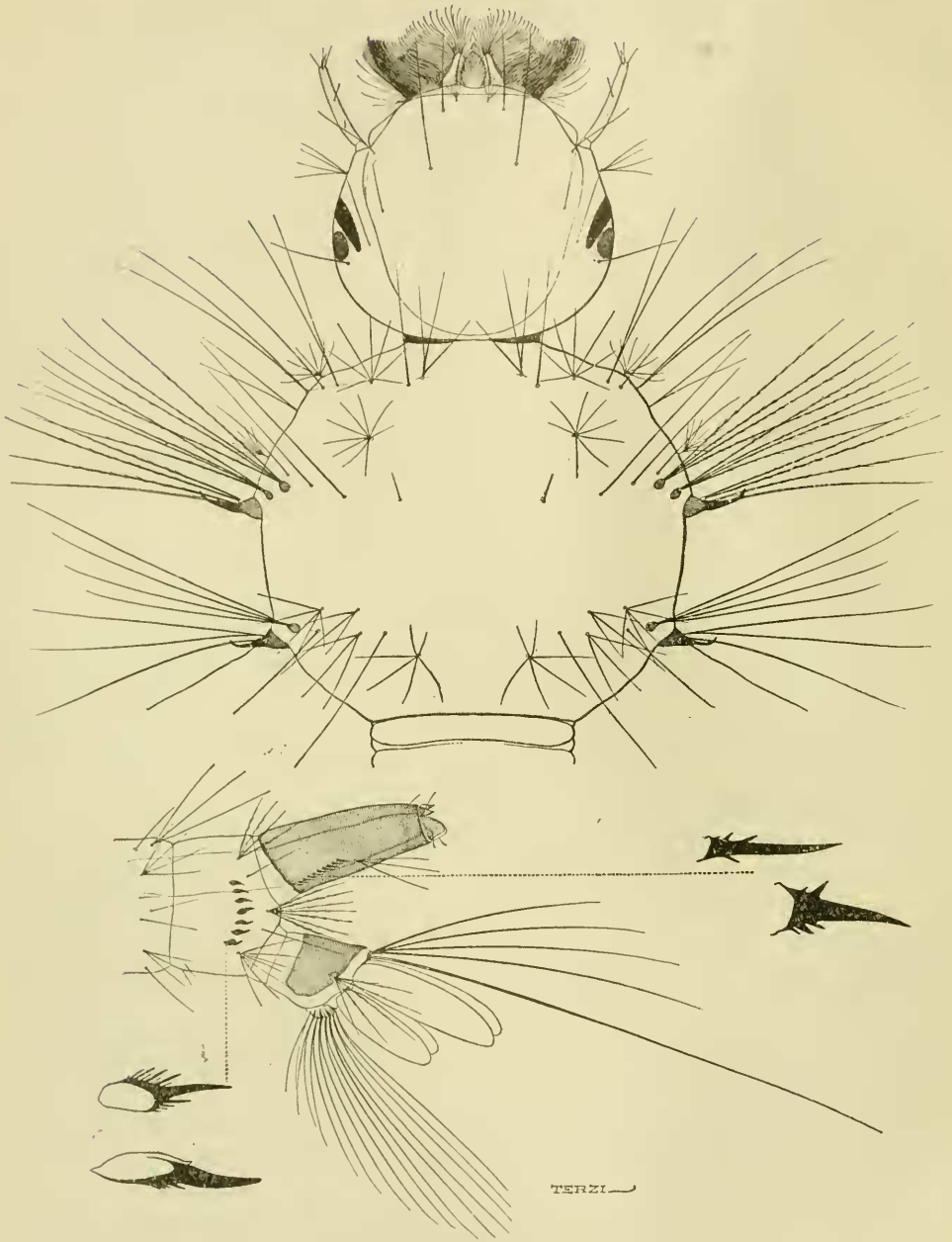


Fig. 1. *Stegomyia metallica*, Edw.

*Pupa*.—There does not appear to be any distinctive feature about the pupa.

*Breeding place*.—The larvae were found in a hollow in a tree at Accra (fig. 2). The water in which they were living was clear, but of a dark brown colour. A few specimens of *Culiciomyia nebulosa* and two of *Stegomyia unilineata* were also bred out from the larvae found in this tree.



Fig. 2. A tree in a hollow of which were found larvae of *Stegomyia metallica*, *S. unilineata* and *Culiciomyia nebulosa*.

This particular strain of *S. metallica* was maintained in the laboratory and is understood to be still flourishing now, seven months since the original larvae were obtained. The mosquitos were kept in glass jars and were fed on honey and blood. In this way generation after generation of larvae was bred without difficulty, and up to the present no sensible effects have been observed as a result of this close in-breeding. When isolated in single pairs, however, *S. metallica* did not breed readily.

The females under these conditions fed on blood reluctantly and did not deposit their eggs either frequently or regularly. In one experiment, for example, a newly hatched female isolated in this way took her first meal of blood on the evening of the eighth day, but did not lay any eggs until the twenty-second day. In this respect *S. metallica* differs notably from *S. fasciata*. When kept together in considerable numbers the mosquitos bred freely, and so far as laboratory experience goes, it seemed immaterial to the larvae whether they were reared in a highly nitrogenous, dark brown medium, such as that in which the original larvae were found, or in a comparatively clear one of tap water with a layer of sand at the bottom. The larvae were observed to remain submerged for long periods and were frequently seen to bury themselves completely in the flocculent deposit which collected at the foot of some of the jars. In this they appeared to obtain assistance from the ventral thoracic spines, both in maintaining their position and in penetrating the deposit. The life-cycle of *S. metallica* in one experiment was as follows:—Egg, 7 days; larval stage, 10 days; and pupal stage, 3 days.

***Stegomyia luteocephala*, Newst. (fig. 3).**

The larva is dark in colour and closely resembles that of *S. fasciata*, the thorax exhibiting hook-like spines of a similar size. The head is dark, the antennae are short, having a single hair in place of a hair-tuft, and the midfrontal hairs are represented

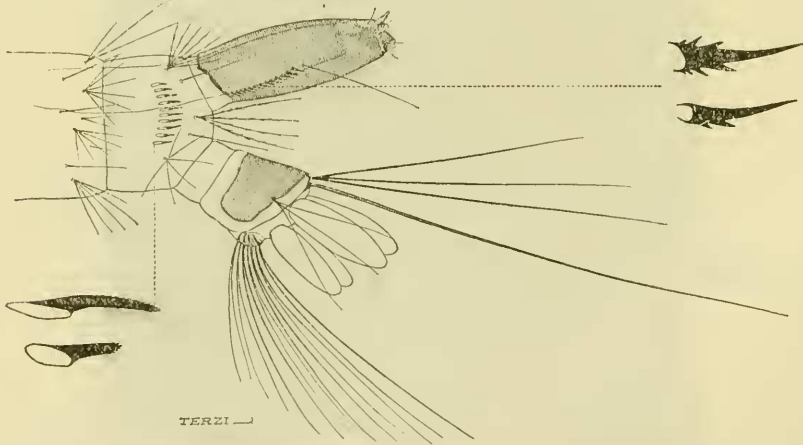


Fig. 3. *Stegomyia luteocephala*, Newst.

by single bristles. The thorax and abdomen bear stellate hairs which are simple in character and not so numerous as those upon *S. metallica*. The comb is formed of 7–10 simple spines, which are longer and narrower than those of *S. metallica*. The siphonal and subsiphonal plumes are composed of simple hairs. The length of the siphon is more than twice the diameter of its base (43 units to 18); the spines of the pecten are 12–15 in number and are placed slightly diagonally, as in *S. metallica*. In the place of the usual hair-tuft a single long stout hair is found; the position of

this hair is well beyond the middle of the siphon. The papillae are longer than the anal segment and have rounded ends; the dorsal pair not much longer than the ventral. As in *S. metallica*, there is a hair-tuft at the lateral edge of the chitinous plate of the anal segment.

*S. luteocephala* comes close to *S. fasciata* in Edwards' key (Bull. Ent. Res. iii, p. 376): 'Siphon more than twice as long as broad; . . . comb scales 8-9'; but the hair-tuft is replaced by a single stout hair, and the comb scales are simple.

*Pupa*.—None was examined.

*Breeding place*.—The larvae were found in the sagging gutters of two bungalows at Accra. The water in which they were living was slightly turbid and contained a layer of decaying vegetable matter.

**Ochlerotatus irritans**, Theo. (fig. 4).

The larvae are light in colour. The head is of moderate size, with rather stout antennae, which carry a tuft of simple hairs towards their outer sides; no constriction is seen at the insertion of this hair-tuft in the middle of the antennae. The median frontal hairs are multiple and are slightly pubescent at their bases. The anterior thoracic hairs are poorly developed. The comb is formed of about 50 scales arranged in a triangular patch. The subsiphonal plume consists of hairs which are scantily plumose, while the hairs of the siphonal and anal plumes appear to be simple. The

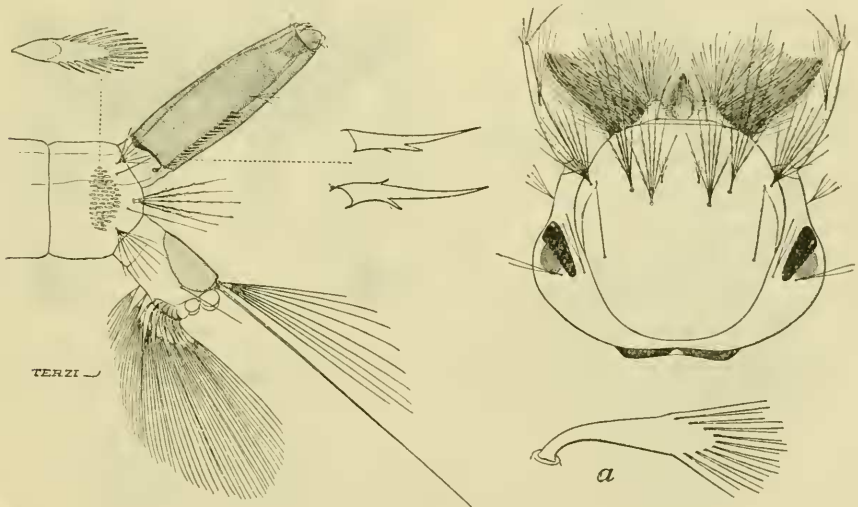


Fig. 4. *Ochlerotatus irritans*, Theo.

length of the siphon is three and a half times the diameter of its base; the pecten, extending to half the length of the siphon, comprises 15-18 spines, and beyond the spines occurs a tuft of three or four hairs. The anal segment is feebly chitinised, while the anal papillae are so short as to appear like projecting knobs.

*O. irritans* comes near to *O. marshalli* in Edwards' key (Bull. Ent. Res. iii, p. 376) "Median tufts on head each composed of 6-8 hairs, pecten with 12-18 teeth. . . . Hair tuft normal, branched, situated in middle of siphon." Judging from Wesché's

description of the larva of *O. marshalli* (Bull. Ent. Res. i, p. 30) it appears to resemble the larva of *O. irritans* closely. The distinguishing points between the two seem to be that the latter has a siphon which is in length three and a half times the diameter of its base, the siphon of the larva of *O. marshalli* being "quite four times as long as its base," according to Wesché. The tuft on the siphon of *O. irritans* is composed of three or four hairs, while "there are plumes of six simple hairs above the spines on each side" in *O. marshalli*. The anal papillae of *O. irritans* are very poorly developed, those of *O. marshalli* as shown in Wesché's illustration are well developed, with pointed ends.

*Pupa*.—None was examined.

*Breeding place*.—The larvae were found in small pools near the lagoon at Accra. The water in these pools is as a rule brackish, and in one sample in which *O. irritans* was flourishing an analysis showed that the chlorine amounted to 1,400 parts per 100,000 (2.2 per cent. salt).

***Ochlerotatus sudanensis*, Theo. (fig. 5).**

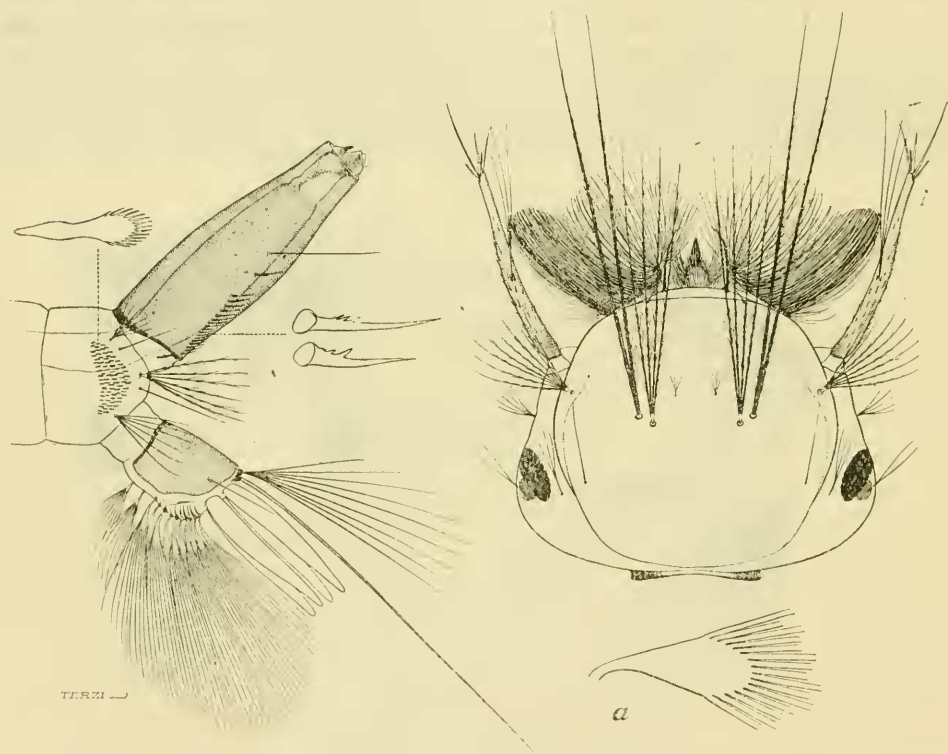


Fig. 5. *Ochlerotatus sudanensis*, Theo.

The larvae in life are grey in colour with a dark siphon, and the head pale. The antennae are well developed and are covered with spicules; the hair-tuft composed of simple hairs is situated before the middle of the antenna. The median frontal hairs are subplumose, the outer pair having two and the inner pair 3-4 branches.

The comb is formed of many scales, 60–70, arranged in a triangle. The siphonal and anal plumes are composed of simple hairs, the subsiphonal of subplumose hairs. The length of the siphon is three times the diameter of its base; there are about 15 spines in the pecten, some of which are detached outwardly, extending beyond the middle of the siphon; a single hair takes the place of the usual tuft. The anal segment is almost as broad as it is long; the hairs on the dorsum are collected into strong tufts, and the ventral beard is well developed, extending over nearly the whole length of the ventral surface, its tufts having a very unusual structure. The papillae are almost twice the length of the anal segment.

*O. sudanensis* may be distinguished from larvae having “Median tufts on head each composed of three hairs” in Edwards’ key (Bull. Ent. Res. iii, p. 376) by the fact that its pecten has about 15 teeth.

*Pupa*.—This has two small dark spots on the margin of each of the anal plates.

*Breeding place*.—The larvae were found along the sides of the stream at Sunyani in small holes made by the youthful natives in their search for crabs. The water contained in the holes is always opaque, holding much suspended matter. Larvae of *Anopheles costalis*, *Culex insignis* and *Uranotaenia annulata* were also obtained from these crab holes.

### **Culex pruina**, Theo. (fig. 6).\*

The larva in life is light-coloured; is possessed of a siphon swollen in the middle, with its distal third much darker than the proximal two-thirds; and bears some resemblance to the larva of *C. duttoni*, being however of smaller size.

The head is of moderate size and is not so wide as the thorax. The antennae are covered with spicules, the hair-tufts, apparently consisting of branched hairs, are inserted at three-fifths of the length of the antennae. The frontal hairs are all plumose. The comb is formed of 35–40 scales arranged in a triangular patch. The hairs of the siphonal and subsiphonal plumes are plumose, those of the anal plume are simple. The siphon is four times the length of its basal diameter, tapering towards the tip; its distal third is more strongly chitinised than the proximal portion, and its pecten of about 20 spines extends nearly to the middle of its length. On the ventral aspect are at least six pairs of strong hair-tufts and numerous spicules are scattered over this surface between those hair-tufts. The anal segment is about as broad as it is long, and in addition to the usual hairs, has a plume of simple hairs laterally.

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\*The adults which Dr. Ingram sent as having been reared from this remarkable larva were *C. pruina*, but the larvae are totally different from those attributed to that species by Dr. W. M. Graham and described by Weschó under the name of *C. pallidothoracis*, Theo. (Bull. Ent. Res. i, p. 36). Dr. Ingram also obtained specimens of this latter form (see fig. 7), which he associated with adults of *C. quiarti*, Bl., though this larva is different from that assigned to *C. quiarti* by Graham. It remains for future investigators to decide which of these two is the true larva of *C. pruina*.—F. W. E.

This larva seemingly should be grouped with that of *C. duttoni* in Edwards' key (Bull. Ent. Res. iii, p. 379). It may be distinguished from the larva of *C. duttoni* by its possessing marked tufts of hairs on the siphon in place of long solitary hairs, and by the number of teeth in the pecten.

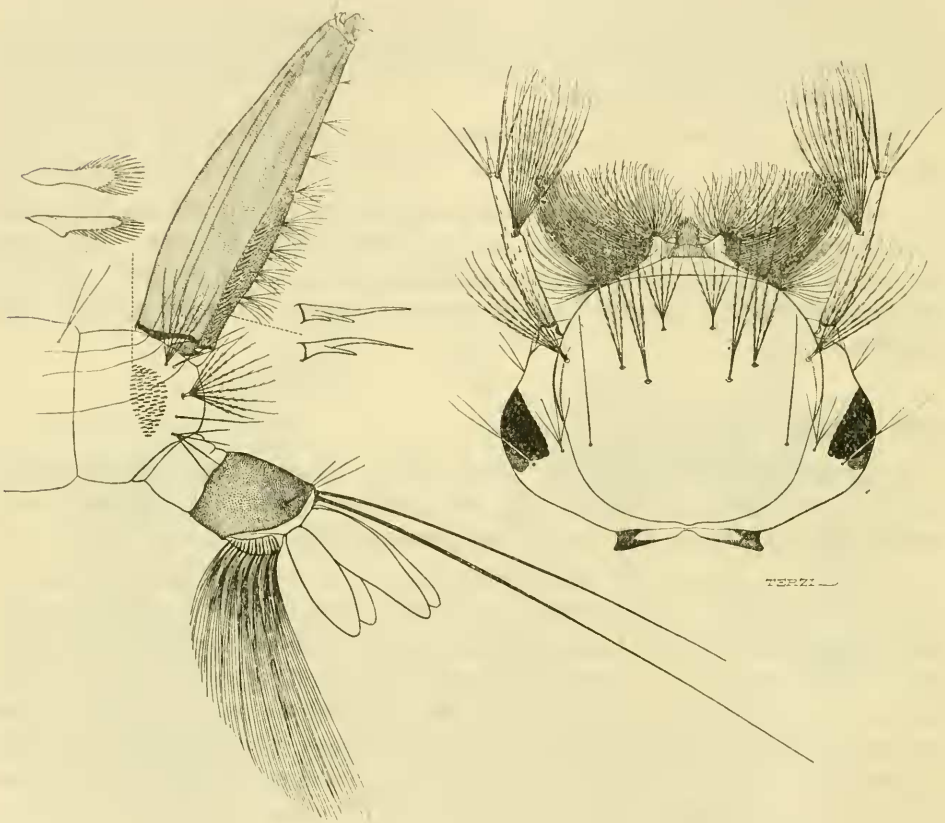


Fig. 6. *Culex pruina*, Theo.

*Pupa*.—There does not appear to be any distinctive feature about the pupa when examined with a low magnification (60 diameters).

*Breeding place*.—The larvae, together with those of *Eretmopodites inornatus*, were found in water of a dark brown colour containing decaying leaves and vegetable matter, filling a hollow in the concrete foundation for the erection of a pump.



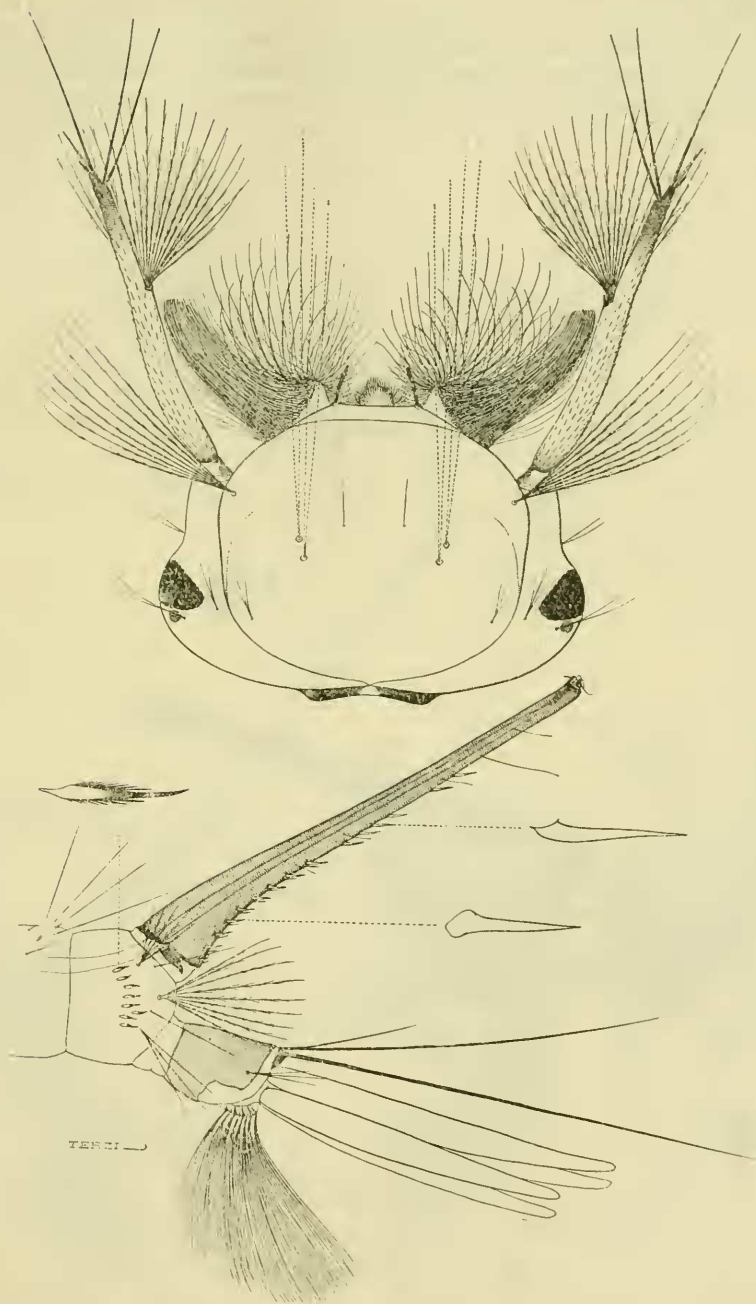


Fig. 7. *Culex* sp. ?—attributed by Dr. W. M. Graham to *Culex pruina*, Theo.

**Culex insignis**, Carter (fig. 8).

Living larva grey in colour, with very dark hairs on the anal segment. The head is large; the antennae dark and covered with spicules; the hair-tuft, which is prominent and consists of plumose hairs, is inserted at three-quarters of the length of the antenna. The palp is seen to be large when the larva is viewed from the side and the brush is

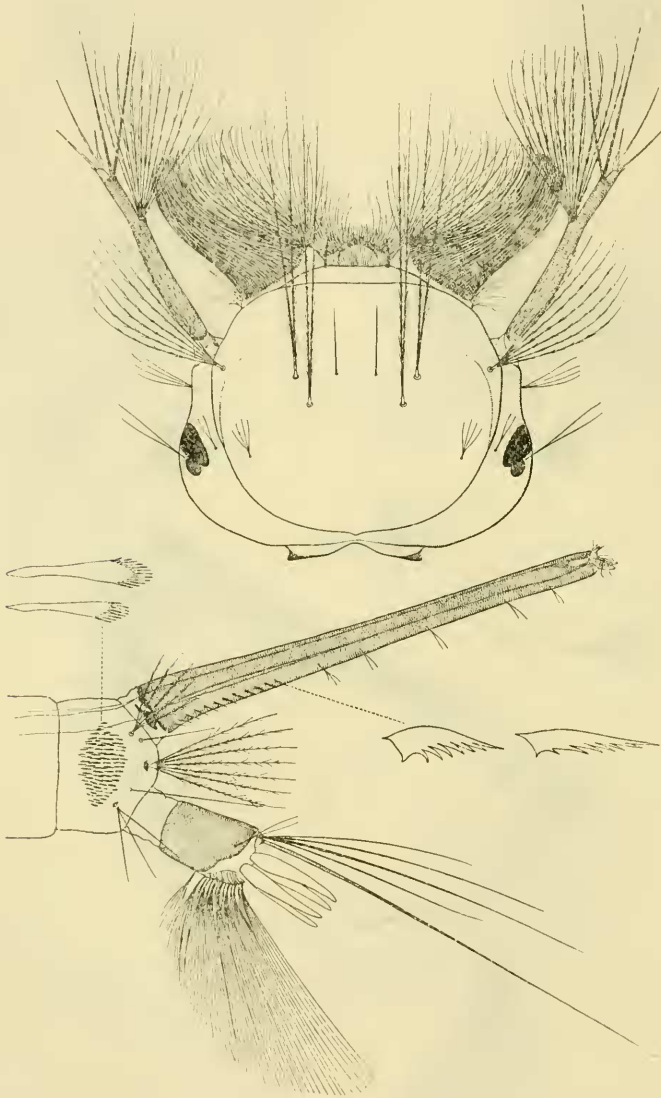


Fig. 8. *Culex insignis*, Carter.

well developed. The median frontal hairs consist of double hairs which are plumose. The anterior thoracic hairs are single and long. The comb is composed of about 70 scales arranged in a triangular patch. The subsiphonal plume is formed of plumose hairs, the siphonal of subplumose hairs, and the anal plume appears to consist of

simple hairs. The siphon is long and narrow, eight or nine times the length of its basal diameter, the pecten extending to a quarter of the length of the siphon, and beyond it are four or five ventral tufts composed of simple hairs. There are 12–15 teeth in the pecten. The anal segment is a little less than twice as long as it is broad, the papillae being sharply pointed, and slightly shorter than the segment. Two of the hairs on the dorsal end of this segment appear to be longer than the siphon.

This larva apparently comes near those of *C. invidiosus* and *C. decens* in Edwards' key (Bull. Ent. Res. iii, pp. 380–381) "Comb of eighth segment with about 40 teeth in a triangular patch. . . . Pecten with 12–15 teeth, antennal tuft at about three-quarters; siphon  $8 \times 1$ ." It may be distinguished by its dark antennae and by the dark hairs on the anal segment. In life its colour should help in the differentiation, as the larvae of *C. invidiosus* and *C. decens* are usually green in colour.

*Pupa*.—The pupa seemingly has no distinguishing characteristic.

*Breeding place*.—The larvae were found in holes excavated by the native children in search of crabs; the water contained in the holes held much matter in suspension.

**Culex ingrami**, Edw. (fig. 9).

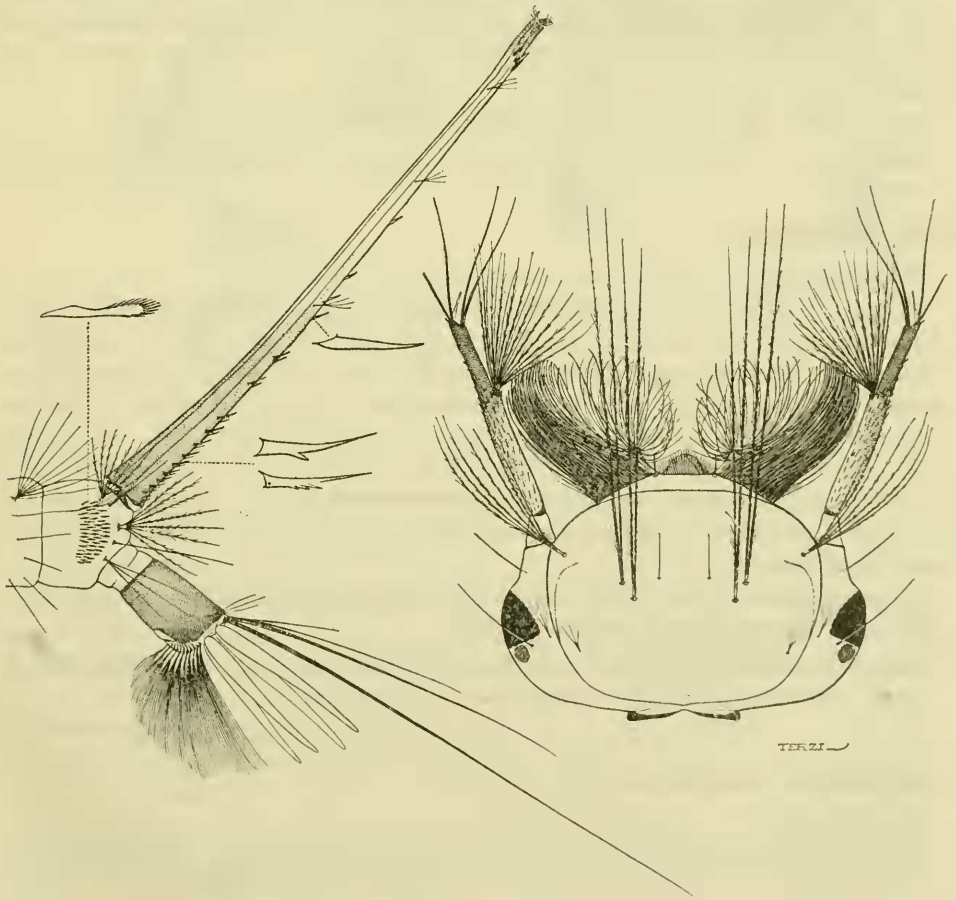


Fig 9. *Culex ingrami*, Edw.

The larvae in life are of a light green colour.

The head is large, being nearly as wide as the thorax. The antennae have the distal third darkened and are covered with spicules, the tufts being placed at two-thirds of the length of the antennae and formed of plumose hairs. The brushes are large, and the mid-frontal hairs are double and plumose. The comb consists of about 50 scales arranged in a triangular patch. The hairs of the subsiphonal and siphonal plumes are plumose, the hairs of the anal plume simple. The siphon is long and narrow, 14 times the length of its diameter at the base and about three-quarters of the length of the abdomen. The pecten is formed of about 12 paired and barbed spines, the last two being more widely separated; beyond these true pecten spines, which extend to about one-third of the length of the siphon, are three or four widely separated spines on the mid-ventral line, and in addition to these there is a group of five or six simple spines lying just below the apex and more closely appressed to the siphon. There are minute hair-tufts of simple hairs inserted between the more widely separated distal spines. The pointed anal papillae are not quite twice as long as the anal segment.

This larva may be distinguished from the other *Culex* larvae in Edwards' key (Bull. Ent. Res. iii, pp. 380-381) which have the "Combs of the eighth segment with about 40 teeth in a triangular patch" by the formation of the pecten and by the length of the siphon,  $14 \times 1$ .

*Pupa*.—The pupa does not appear to have distinctive features.

*Breeding place*.—The larvae were found in deep pools of clear water in the thick forest.

#### ***Culex consimilis*, Newst.**

The larva in life is of a brilliant green colour.

The head is large and the abdomen well developed. The hair-tuft is formed of simple hairs and is inserted at or just before the middle of the antenna. The thorax and abdomen have the usual plumes. The comb is formed of six teeth arranged in an irregular line, there being a simple hair at either end of this line of spines. The hairs of the subsiphonal plume are plumose, those of the siphonal pubescent. The length of the siphon is ten times the diameter of its base and is less than half the length of the abdomen (147 units to 356, average of six measurements). The pecten consists of six feebly developed spines, which increase in size distally, the last being detached from the others.

Apparently there is little if any difference between this larva and that of *C. annulioris* in Edwards' Key (Bull. Ent. Res. iii, p. 381).

*Pupa*.—The respiratory tubes have large apertures which are directed anteriorly, the tubes being placed nearly parallel one with the other.

*Breeding place*.—The larvae were found in masses of filmy algae in clear water.

#### ***Eumelanomyia inconspicua*, Theo. (fig. 10).**

The larva in life is very dark in colour.

The head is dark and large being nearly as wide as the thorax. The antennae are well developed, with a tuft of subplumose hairs situated at about the middle (described from a single specimen). The midfrontal hairs are single and subplumose at their

bases. The anterior thoracic plumes consist of simple hairs, the posterior thoracic and abdominal plumes of plumose hairs. The comb is composed of about 50 scales arranged in a triangular patch. The hairs forming the subsiphonal and siphonal plumes are plumose. The siphon is narrow and long, its length being ten times the diameter of its base, and the pecten of a dozen spines extends for one-fifth of its length. Beyond the pecten are slender tufts of simple hairs, two or three in number. The anal segment is nearly twice as long as it is wide, has a moderate-sized ventral beard and long hairs, as long as the siphon, on the dorsal end. The dorsal pair of anal papillae is pointed and twice as long as the anal segment (ventral pair missing).

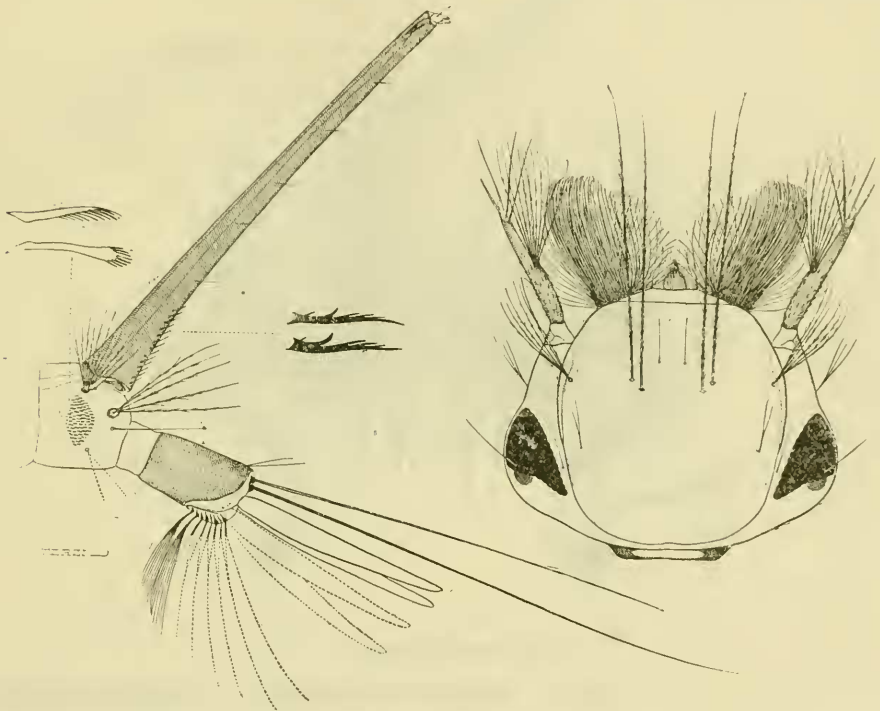


Fig. 10. *Eumelanomyia inconspicua*, Theo.

Apparently this larva should be grouped with the *Culex* and *Culiciomyia* larvae in Edwards' key to the genera (Bull. Ent. Res. iii, p. 373): "Siphon usually elongated, its hair-tufts numerous." It may be distinguished from *Culex* larvae which have "Combs of the eighth segment with about 40 teeth" and have "siphons longer than  $4 \times 1$ , with pecten of 12-15 teeth" (*op. cit.*, pp. 380-381) by the fact that its mid-frontal hairs are single and stout.

*Pupa.*—The pupa is very dark in colour, but does not appear to be possessed of distinctive features.

*Breeding place.*—The larvae were found, together with about a dozen pupae of the same species, in clear water in the burnt-out hollow of a fallen tree in a clearing in the forest.

**Mimomyia hispida**, Theo. (figs. 11, 12).

The larvae are grey in colour in life, and while resembling the larvae of *M. mimomyiaformis* in configuration, are of a much lighter colour.

The head is large, the antennae having a similar peculiar outwardly directed appendage to that possessed by the larva of *M. mimomyiaformis*; this portion is much lighter in colour than the basal portion and the spicules which cover the base are absent. Two long bristles occur at the junction of the apical with the basal part.

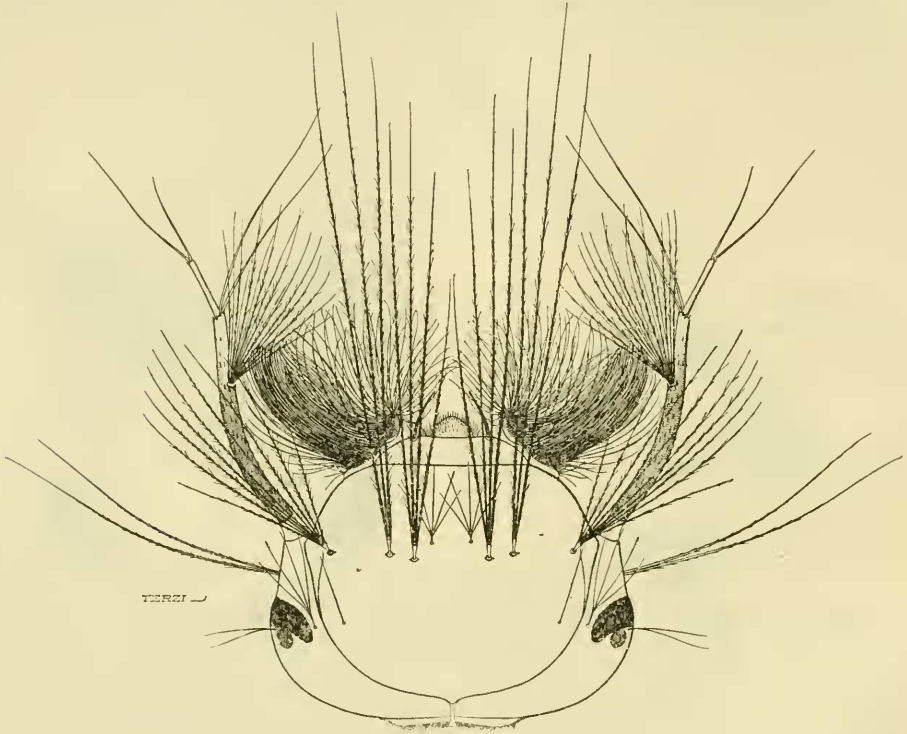


Fig. 11. *Mimomyia hispida*, Theo.

The hair-tuft is situated at about three-fifths of the length of the basal portion of the antenna and is formed of plumose hairs. All the frontal hairs are markedly plumose and there is a bifurcated subplumose hair of considerable size projecting laterally from the head in front of the eye. The palp is large. The long thoracic and abdominal hairs are strongly plumose. The comb is formed of two rows of spines in arched lines, the posterior row consisting of 5-7 large, the anterior of about twenty small spines. The subsiphonal plume is composed of plumose hairs, the hairs of the siphonal and the anal plumes being pubescent. There are many stellate hairs on the abdominal segments. The siphon is six times the length of its diameter at the base, there being three or four feebly developed spines in a horizontal row at its base ventrally and a strong tuft of simple hairs inserted well before the middle. The anal segment is longer dorsally than ventrally and its posterior edge is markedly spinose. The dorsal hairs are collected into strong tufts, while the ventral beard is feebly developed, and there is laterally a long subplumose hair. The anal papillae are about as long as the anal segment.

This larva may be distinguished from the other known larvae belonging to small species of this genus by its double row of spines in the comb (Bull. Ent. Res. iii p. 383).

*Pupa*.—The pupae of this species do not appear to have the outer third of the respiratory tubes light-coloured (Bull. Ent. Res. iii, p. 384), but only the tips.

*Breeding place*.—The larvae were found in marshy ground along the edge of the stream at Sunyani, together with the larvae of *M. plumosa* and those of *Uranotaenia alboabdominalis*.

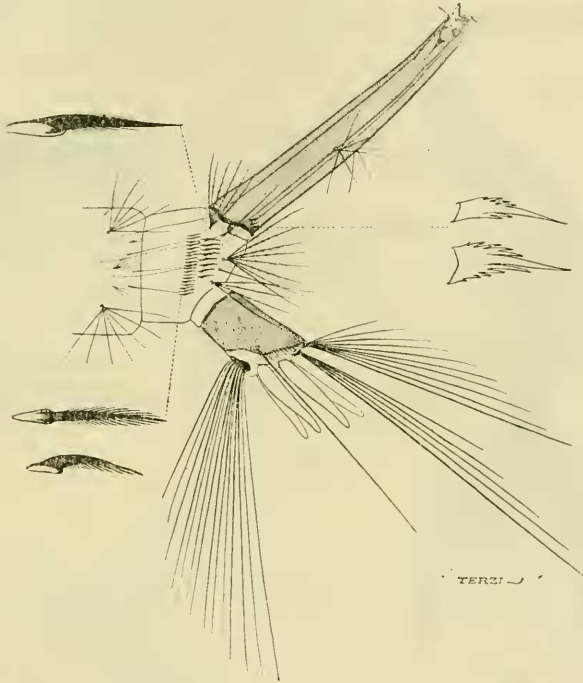


Fig. 12. *Mimomyia hispida*, Theo.

***Uranotaenia annulata*, Theo. (fig. 13).\***

The larva in life measures about 6 mm. being nearly twice as long as the larva of *U. alboabdominalis*. It is of a light grey colour with very dark head and siphon.

\*In my paper on African Mosquito Larvae (Bull. Ent. Res. iii, p. 378) I briefly noted a larva which had been received as that of *Stegomyia sugens* or *Uranotaenia nigripes*, and appeared peculiar in having a lateral chitinous plate in addition to the comb on the eighth segment. Mr. Knab shortly afterwards wrote suggesting that this larva might be a *Uranotaenia*, as the possession of a chitinous plate with the comb at the edge was one of the characters of the genus, a fact of which I was not then aware. Dr. Ingram's interesting discovery of the larva of *U. annulata* proves that the Sierra Leone larva must indeed be that of *U. nigripes*, as the two are very similar and agree in having rounded heads and slender frontal hairs. The chief points of difference between *U. nigripes* and *U. annulata* are as follows: the two anterior pairs of frontal hairs are placed far forward, the outer three branched, the inner simple and much closer together than in *U. annulata*; the comb-teeth are about 14 in number and sharply pointed; the siphon is narrower towards the tip; and the anal papillae are nearly three times the length of the anal segment.

It is interesting to note that the group *Pseudoficalbia*, to which both these species belong, can apparently be defined on the characters of the larval head as well as on the scale characters of the adults.—F. W. Edwards.

The head is small, rather broad and rounded (for a *Uranotaenia*) and dark in colour. The antennae are small and stunted, without any visible hair-tuft or hair. The eyes seem to be set further forward on the head than is the case in the majority of larvae. The mid-frontal hairs are represented by single slender bristles, quite unlike the stout spines found in typical species of *Uranotaenia*. The anterior thoracic hairs are numerous but short, the mid and posterior thoracic plumes being formed of plumose hairs, and the long hairs on the anterior abdominal segments are subplumose. There are numerous stellate hairs on the sternum and venter, but the stellate hairs which are so marked a feature upon the dorsum of the abdominal segments of the other two

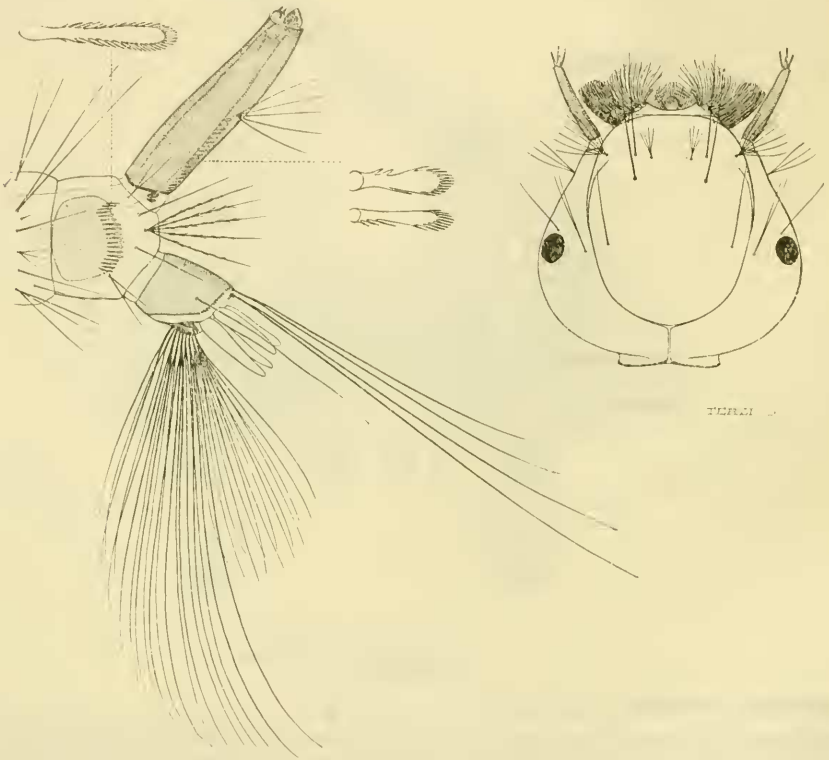


Fig. 13. *Uranotaenia annulata*, Theo.

known larvae of this genus are not visible. The comb consists of an arched line of scales, about 15-18 in number, the convexity of the arch being posterior; the scales are very regularly placed and are of about equal size. The chitinous plate on the edge of which the comb scales are set is large, but feebly developed. The subsiphonal plume is composed of plumose hairs, the siphonal and anal plumes being poorly developed and apparently consisting of simple hairs. The siphon is about four times as long as the diameter of its base; the pecten, extending for about half the length of the siphon, is formed of 18 to 20 blunt-ended and fringed scales, which are similar to those of the comb, very regular and all of equal size; beyond the pecten is a hair-tuft of five hairs. The anal segment is longer than it is wide, with long dorsal hairs



and a distinct ventral beard, the hairs composing the tufts of which are few in number ; a long single hair is present laterally and the posterior edge shows a row of slender spicules. The anal papillae are equal in length to the anal segment.

This larva may be readily distinguished from the two other known larvae of the genus by its large size, by the shape of the head and the slender frontal hairs, and by the number of scales (the other two have spines not scales on the eighth segment) in the comb, which number about twenty.

*Pupa*.—None was collected.

*Breeding place*.—The larvae were found in excavations made by the searchers after crabs along the margins of the stream at Sunyani.

***Uranotaenia alboabdominalis***, Theo. (fig. 14).

The larva in life measures  $3\frac{1}{2}$ –4 mm. and is of a light grey colour, whereas the larva of *U. balfouri* is usually dark.

The head is narrow and elongated, and is not so dark as the head of the larva of *U. balfouri* ; the eyes in this species also seem to be placed further forward upon the head than is customary. The antennae are light in colour, short, stunted and without hair-tuft or hair. The mid-frontal hairs are replaced by single stout, spine-like and somewhat flattened bristles ; in front of these bristles are two stellate hairs upon the face. In addition to the usual long plumes on the thorax and abdominal segments,

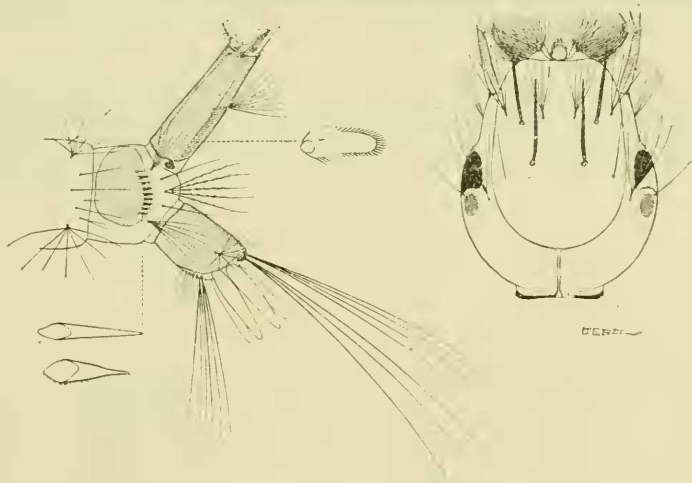


Fig. 14. *Uranotaenia alboabdominalis*, Theo.

there are numerous stellate hairs, which are most marked upon the abdomen. The comb is formed of 8–9 spines, set in a curved line having its convexity posteriorly directed ; these spines are very uniform in size, and are set on the posterior edge of the conspicuous lateral chitinous plate. The subsiphonal plume is composed of subplumose hairs, the siphonal and anal plumes apparently of simple hairs. In addition to the plumes on the eighth segment, there are one or two stout single hairs and a single stellate hair-tuft. The siphon is in length about  $3\frac{1}{3}$  times the diameter of its

(C250)

base; the pecten, which appears to be formed of 12–15 truncated scales when looked at from the side, extends to just beyond the middle of the siphon. The scales of the pecten are so regularly arranged as to give the impression of a palisade and are followed by a pediculate tuft of simple hairs. The siphon measures a quarter of the length of the abdomen and its valves are large. The anal segment is longer than it is wide (18 units to 12) and has a distinct beard and tufts of hairs on the dorsum, there being also two tufts of stellate hairs laterally; the posterior edge seems to be less conspicuously fringed with spicules than is the case in the larva of *U. balfouri*.

This larva appears to resemble that of *U. balfouri* closely (in its natural conditions it should, however, be readily distinguished by its lighter general colour and pale-coloured head), but the spines of the comb are more numerous and more uniform in size. In *U. balfouri* these spines rarely exceed six in number, and are more widely separated, one spine being usually much larger than the others.

*Pupa*.—The pupa shows the same peculiarly formed plates as are seen in that of *U. balfouri*, described by Wesché (Bull. Ent. Res. i, p. 50) as knife-like.

*Breeding place*.—The larvae were found, together with those of *Mimomyia plumosa* and *M. hispida*, in marshy ground along the banks of the Sunyani stream.

We have to express our indebtedness to Mr. F. W. Edwards, of the British Museum, for kindly identifying the mosquitos bred from these larvae; he has also been good enough to suggest certain emendations in the descriptions here given, and has supervised the preparation of the admirable drawings by Mr. A. J. E. Terzi.

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